

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	64	451/93.ccls.	US-PGPUB; USPAT; USOCR	ADJ	OFF	2005/06/21 19:10
L2	2888	134/6.ccls. or 134/7.ccls. or 134/8.ccls.	US-PGPUB; USPAT; USOCR	ADJ	OFF	2005/06/21 19:11
L3	652	134/8.ccls.	US-PGPUB; USPAT; USOCR	ADJ	OFF	2005/06/21 19:11
L4	38	I3 and magnetic	US-PGPUB; USPAT; USOCR	ADJ	OFF	2005/06/21 19:13

WEST Search History

DATE: Tuesday, June 21, 2005

<u>Hide?</u>	<u>Set Name</u>	<u>Query</u>	<u>Hit Count</u>
		<i>DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=ADJ</i>	
<input type="checkbox"/>	L4	3695934	15
<input type="checkbox"/>	L3	L2 and 134/\$.ccls.	27
<input type="checkbox"/>	L2	magnetic.ti. with clean\$.ti.	3116
<input type="checkbox"/>	L1	magnetic with clean\$	16071

END OF SEARCH HISTORY

Day : Tuesday
Date: 6/21/2005


PALM INTRANET

Time: 18:09:22

Inventor Name Search Result

Your Search was:

Last Name = SHINOZAKI

First Name = KENICHI

Application#	Patent#	Status	Date Filed	Title	Inventor Name 7
10784188	Not Issued	071	02/24/2004	PRODUCT DISASSEMBLING AND ASSEMBLING SYSTEM AND A METHOD OF DISASSEMBLING AND ASSEMBLING THE PRODUCT	SHINOZAKI, KENICHI
10697115	Not Issued	030	10/31/2003	CLEANING SYSTEM AND A METHOD OF CLEANING	SHINOZAKI, KENICHI
09819892	6722010	150	03/29/2001	PRODUCT DISASSEMBLING AND ASSEMBLING SYSTEM AND A METHOD OF DISASSEMBLING AND ASSEMBLING THE PRODUCT	SHINOZAKI, KENICHI
09816379	6663719	150	03/26/2001	CLEANING SYSTEM AND A METHOD OF CLEANING	SHINOZAKI, KENICHI
09288849	6108892	150	04/09/1999	SEAL MEMBER AUTOMATIC FITTING APPARATUS AND METHOD	SHINOZAKI, KENICHI
07755058	5221586	150	09/05/1991	POWER GENERATION SYSTEM USING FUEL CELLS	SHINOZAKI, KENICHI
07088124	4927356	150	08/21/1987	GAS BURNER	SHINOZAKI, KENICHI

Inventor Search Completed: No Records to Display.

Search Another: Inventor	Last Name	First Name	
	<input type="text" value="SHINOZAKI"/>	<input type="text" value="KENICHI"/>	<input type="button" value="Search"/>

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Day : Tuesday
Date: 6/21/2005


PALM INTRANET

Time: 18:17:15

Inventor Name Search Result

Your Search was:

Last Name = MARUYAMA

First Name = TOHRU

Application#	Patent#	Status	Date Filed	Title	Inventor Name 21
<u>60612089</u>	Not Issued	018	09/21/2004	146MM28GB NAND FLASH MEMORY WITH 70NM CMOS TECHNOLOGY	MARUYAMA, TOHRU
<u>10993448</u>	Not Issued	030	11/22/2004	SEMICONDUCTOR DEVICE	MARUYAMA, TOHRU
<u>10784188</u>	Not Issued	071	02/24/2004	PRODUCT DISASSEMBLING AND ASSEMBLING SYSTEM AND A METHOD OF DISASSEMBLING AND ASSEMBLING THE PRODUCT	MARUYAMA, TOHRU
<u>10742952</u>	<u>6828627</u>	150	12/23/2003	SEMICONDUCTOR DEVICE	MARUYAMA, TOHRU
<u>10697115</u>	Not Issued	030	10/31/2003	CLEANING SYSTEM AND A METHOD OF CLEANING	MARUYAMA, TOHRU
<u>09819892</u>	<u>6722010</u>	150	03/29/2001	PRODUCT DISASSEMBLING AND ASSEMBLING SYSTEM AND A METHOD OF DISASSEMBLING AND ASSEMBLING THE PRODUCT	MARUYAMA, TOHRU
<u>09816379</u>	<u>6663719</u>	150	03/26/2001	CLEANING SYSTEM AND A METHOD OF CLEANING	MARUYAMA, TOHRU
<u>09714228</u>	<u>6703669</u>	150	11/17/2000	SEMICONDUCTOR DEVICE HAVING SERIALY CONNECTED MEMORY CELL TRANSISTORS PROVIDED BETWEEN TWO CURRENT TERMINALS	MARUYAMA, TOHRU
<u>09503459</u>	<u>6222769</u>	150	02/14/2000	NONVOLATILE SEMICONDUCTOR STORAGE DEVICE HAVING BURIED ELECTRODE WITHIN SHALLOW TRENCH	MARUYAMA, TOHRU

<u>09393656</u>	<u>6117240</u>	150	09/10/1999	LIQUID APPLYING APPARATUS AND AN IMAGE FORMING SUBSTANCE REMOVING APPARATUS	MARUYAMA, TOHRU
<u>09186605</u>	<u>6156127</u>	150	11/06/1998	METHOD AND APPARATUS FOR REMOVING IMAGE FORMING SUBSTANCE FROM IMAGE HOLDING MEMBER	MARUYAMA, TOHRU
<u>09090625</u>	<u>6034894</u>	150	06/04/1998	NONVOLATILE SEMICONDUCTOR STORAGE DEVICE HAVING BURIED ELECTRODE WITHIN SHALLOW TRENCH	MARUYAMA, TOHRU
<u>09003640</u>	<u>5968272</u>	150	01/07/1998	LIQUID APPLYING APPARATUS AND AN IMAGE FORMING SUBSTANCE REMOVING APPARATUS	MARUYAMA, TOHRU
<u>08816498</u>	<u>5896612</u>	150	03/13/1997	METHOD AND APPARATUS FOR REMOVING IMAGE FORMING SUBSTANCE FROM IMAGE HOLDING MEMBER	MARUYAMA, TOHRU
<u>08595835</u>	<u>5597456</u>	150	02/02/1996	METHOD FOR PRODUCING MEDICAL MATERIALS	MARUYAMA, TOHRU
<u>08589562</u>	<u>5759278</u>	150	01/22/1996	LIQUID APPLYING APPARATUS AND AN IMAGE FORMING SUBSTANCE REMOVING APPARATUS	MARUYAMA, TOHRU
<u>08575488</u>	<u>5716036</u>	250	12/20/1995	MOUNTING STRUCTURE FOR MOUNTING A POLYGON MIRROR	MARUYAMA, TOHRU
<u>08546757</u>	<u>5892247</u>	150	10/23/1995	SEMICONDUCTOR DEVICE AND A MANUFACTURING METHOD THEREOF	MARUYAMA, TOHRU
<u>08385159</u>	<u>5642550</u>	150	02/07/1995	APPARATUS FOR REMOVING IMAGE FORMING SUBSTANCE FROM IMAGE HOLDING MEMBER	MARUYAMA, TOHRU
<u>08254947</u>	Not Issued	167	06/07/1994	MEDICAL MATERIALS AND METHODS FOR PRODUCING THE SAME	MARUYAMA, TOHRU
<u>08022134</u>	<u>5357162</u>	250	02/25/1993	A SPINDLE MOTOR USING DYNAMIC PRESSURE BEARINGS	MARUYAMA, TOHRU

Inventor Search Completed: No Records to Display.

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US-PAT-NO: 3514328
DOCUMENT-IDENTIFIER: US 3514328 A
TITLE: METHOD FOR CLEANING TEETH
DATE-ISSUED: May 26, 1970
INVENTOR: MALIN EUGENE F

US-CL-CURRENT: 433/216, 134/7 , 134/8 , 433/119 , 451/93

May 26,,1970 E. F. MALIN 3p514t328 METHOD FOR CLEANING TEETH Filed
Sept. 27,
1967 4 20 14 (22 o-- FREQUENCY 24 MULTIPLIE 16 26 Z@- -r4l ev e
INVENTO)?.

3 1 5 1 4 , 3 2 8 Utited States Patent Office P a t e n t e d M a y
2 6 , 1 9
7 0 2 Also, it is an object of this invention to provide a new
3,514,328 and
improved teeth cleaning method and apparatus. METHOD FOR CLEANING
TEETH
Another object of the present invention is to provide Eugene F.
Malin, 1920 S.
Ocean Drive, a novel method and apparatus for stirring and agitating
Fort
Lauderdale, Fla. 33301 a material placed in a cavity for cleaning
the items
Filed Sept. 27, 1967, Ser. No. 671,001 5 therein. Int. Cl. B08b
7100; A61c
17100 U.S. Cf. 134-1 5 cwms Still another object of the present
invention is to
pro- vide a novel method and apparatus for stirring and agi- tatin g
a material
sealed by the lips and tongue in a mouth ABSTRACT OF THE DISCLOSURE
10 cavity
by a device held outside of the mouth cavity. A further object of
this
invention is to provide a fast A teeth cleaning method and apparatus.
The
method cleaning method and apparatus. comprises the placing of
material
susceptible to a mag- A further object of this invention is to
provide a ma-
netic field in a mouth cavity and thereafter subjecting terial that

can be
agitated by a magnetic field produced the material to a varying
magnetic field
in order to im- 15 by a magnetic field-producing device for cleaning
teeth.
part motion to the material to clean the teeth in the A fii I rther
object of
this invention is to provide a mag- mouth cavity. The apparatus
comprises a
material includ- netic field-producing device that may be held
outside of ing a
fluid, having particles therein that are susceptible to the irfourth
cavity in
order to stir and agitate a material a varying magnetic field that
will impart
motion to the that ig sealed within the mouth cavity for cleaning the
particles, and a magnetic field-producing device including a
transducer for
producing a varying magnetic field that 20 teeth therein. An
additional object
of this invention is to provide a imparts motion to the particles in
order to
clean the teeth teeth cleaning method and apparatus that will cleanse
in the
mouth cavity. the surface of teeth and the surfaces between the
teeth in a
mouth cavity by utilizing a material including a 25 fluid having
particl es
therei n suscep tible to a magne tic BACKGROUND OF INVENTION field.
This
invention relates to a new and improved cleaning In accordance with
these and
other objects which will method and apparatus, and, more
particularly, to a
meth- be apparent hereinafter, the instant invention will be deod of
cleaning
teeth by utihzing a varying magnetic field scribed with particular
reference to
the accompanying to impart motion to material placed in a mouth
cavity, 30
drawing illustrating this apparatus. and apparatus comprising, a
material
including a fluid having particles therein susceptible to a magnetic
field for
cleaning teeth, and a magnetic field-producing device. As is perhaps
weh-known, many teeth cleaning methods and apparatus have been
utilized to
clean teeth in a mouth cavity. One of the oldest methods is to apply
a
cleansing agent such as a tooth paste or powder to a brush that is

placed in the mouth cavity in order to scrub the teeth clean. In the past, brushes of various design have been operated by hand or motor-driven devices to scrape or abrade the surface of teeth to remove unwanted particles, also, vibrating devices, such as magneto-strictive tools, have been utilized by dental personnel to periodically clean teeth surfaces. In order to effectively remove foreign substances from between teeth in a mouth cavity, streams of water and thin materials, such as waxed strings, have been employed.

SUMMARY; OF

INVENTION The present invention relates to a new and improved teeth cleaning method and apparatus. The method utilizes a varying magnetic field-producing device to impart motion to a material placed in a mouth cavity for cleaning the teeth therein. In the preferred embodiment of the apparatus, the material includes a fluid including cleansing ingredients, and particles that are susceptible to a magnetic field, and the magnetic field-producing device includes a transducer for converting electrical energy into a magnetic field that varies in direction and intensity for imparting motion to the particles which, in turn, imparts motion to the fluid and the cleansing ingredients. In the preferred method of cleaning teeth, the material is placed in the mouth cavity and sealed therein by the lips and tongue. The magnetic field-producing device is placed outside of the mouth cavity for producing a varying magnetic field that penetrates the mouth cavity to impart motion to the particles and fluid in the mouth cavity in order to clean the surfaces of the teeth, as well as the surface between the teeth. It is an object of this invention to provide a new and improved magnetic cleaning method and apparatus.

BRIEF DESCRIPTION OF THE DRAWING In the drawing: FIG. 1 is a side view, partially cross-section, showing 35 the preferred embodiment of this

invention
in operation; FIG. 2 is a block diagram of the magnetic field-producing device;
FIG. 3 is a side view of a core arrangement. 40 DESCRIPTION OF THE PREFERRED EMBODIMENT Referring now in detail to the drawings, wherein the preferred embodiment of the invention is shown, and referring particularly to FIG. 1, the magnetic field-producing device, generally designated as numeral 2, produces a varying magnetic field in order to stir or agitate a material 4 placed in the mouth cavity 6, of a human. The material 4 includes a fluid, shown as 8, with particles, shown as 10, therein that are susceptible to a magnetic field produced by device 2. The material 4 is placed in the mouth cavity 6 and sealed therein by lips 12 and tongue 14. When the magnetic field-producing device 2 is connected to a power source, such as ordinary house 55 current, by corrector 16 and activated by closing switch 18, a varying magnetic field is produced that varies in direction and intensity with time for imparting motion to the particles 10, which, in turn, imparts motion to the material 4 for cleaning teeth 20. The material 4 may 60 also contain cleansing agents to aid in cleaning the teeth. The teeth in the mouth cavity may therefore be cleaned by the magnetic field-producing device 2 that is held outside of the mouth cavity. The magnetic field-producing device or scrubbing unit may therefore be operated externally, with only the magnetic field penetrating the mouth cavity. Hygienically, this device may be utilized by many people without transferring germs from one person to another, since the device itself is not placed in the mouth cavity. 70 Although the magnetic field-producing device 2 may theoretically include an electric motor rotating permanent magnets in order to produce a varying magnetic field, one

3 preferred embodiment of this invention is shown in FIG. 2 in block diagram in a non-complex form. The power source, ordinary alternating current that is supplied to homes and the like, is connected to the magnetic field-producing device by wires 16, although the power source could be a battery-powered oscillator. A switch 18 is placed in the line in order to activate or shut down the magnetic field-producing device. FIG. 2 also shows a means for delivering an output with a frequency that is a multiple of the input frequency. A frequency multiplier 22 is connected to the power by wires 16 and switch 18. Various well-known circuits can be used to obtain the desired frequency, for example, frequency doublers or converters may be utilized. In the preferred embodiment a relatively high frequency is produced in order to provide the desired varying magnetic field. The frequency multiplier 22 is connected to transducer 24 in order to convert the electrical energy into a magnetic field. The transducer is shown as an ordinary coil 24. Other well-known transducers for producing a magnetic field may be utilized. The illustration in FIG. 3 shows a coil having a core 26 with windings 28. Various magnetic field patterns may be derived by utilizing particular winding and core patterns. A plurality of winding and core patterns may be combined in a single magnetic field-producing device in order to clean various portions of the teeth in a mouth cavity. The various magnetic field patterns may be brought into play by changing the physical orientation of the magnetic field-producing device in relation to the teeth in the mouth cavity, or, the various magnetic field patterns may be brought into play by switch controls that control the current into the various winding and core patterns. The method of cleaning teeth in a mouth cavity in the preferred embodiment includes placing magnetic particles in the mouth cavity in order that the magnetic particles

can be moved
by the magnetic field in predetermined patterns while they are being
agitated
to clean the teeth quickly and propely. This method may be utilized
to clean
between adjacent teeth as well as the inner and outer faces of the
teeth. The
controllable variables in the present invention provide the means for
controlling the cleaning operation in order to provide the proper
forces
required to clean the teeth in the mouth cavity of a specific
individual. The
number, size and configuration of the particles placed in the mouth
cavity with
the fluid, as well as the cohesive force of the particle, may be
altered to
provide specific cleaning objectives. The viscosity of the fluid
utilized, may
also be varied. Also, the frequency and amplitude of the electrical
energy
supplied to the transducer and the specific transducer being
energized, may be
changed easily by the user of the magnetic field-producing device
when a
plurality of well-known control circuits are provided with accessible
control
knobs. All of the above variables may be manipulated singularly or
in a fixed
pattern to provide desired results in preparing and cleaning one's
teeth. The
optimum ranges and values of the above variables are readily
ascertainable.
The time for cleaning one's teeth may be shortened by cleaning all
the teeth at
the same time by using a wide magnetic field, or intensifying the
particular
pattern of agitation. The size of the permanent magnetic particles
may be
varied depending mainly on the space between one's teeth or the force
holding
the teeth in contact. The particles are forced between teeth that
abut one
another by the force of the magnetic field. Permanent -magnetic
material
between 0.01 and several microns may be used in the fluid. The
viscosity of
the cleaning fluid may be used to limit the distance of travel of
each particle
during each cycle of travel. The fluid provides a medium for the
particles to

travel in. The fluid also carries the cleaning agents that make cleaning easier. Also, the fluid carries the unwanted material removed from the teeth out of the mouth 3)514)328 4 cavity when the material 4 is ejected from the mouth cavity. It has been found that a material comprising a fluid having a plurality of permanent magnetic particles therein may be a.-itated in a controlled fashion by a varying magnetic field in order to clean items placed in a cavity. The magnetic field will impart motion to each of the permanent magnets within the fluid. The material held in a cavity is agitated throughout its volume. The magnetic 10 particles are moved by the varying magnetic field which effects the fluid by imparting motion to the fluid volume. The maximum size of the permanent magnetic particles that may be used is determined largely by the closfness and relationship of the space, if any, between the teeth 15 in a mouth cavity and the force required to separate the teeth abutting one another. The minimum size of the per-manent magnetic material varies between 0.01 and several microns in diameter. The shape of the particles can ran,@e from generally spherical to irregular and non- 20 uniform configuration. The particular shape is determined by the abrasive qualities desired and the effectiveness of the varying magnetic field on the particular shape. Various materials may be used when manufacturing the magnetic particles, such as barium ferrite. The par- 25 ticles may also be coated in order to encase them with a layer of inert material. Various plastics as well as other material may be used as a coating material to separate the magnetic material from the fluid and other items in the mouth cavity. The coatin.- material will prevent various 30 undesirable chemical reactions from taking place. It should be noted that magnetic particles havin.- a non-spherical shape are preferable because the

irregularities in the non-uniform shape will aid in the cleaning process. The magnetic field imparts rotation and 35 spins each of the magnetic particles as they tend to align themselves in proper orientation in the magnetic field. The magnetic field also imparts a translation motion to the non-uniform magnetic particles. The resulting magnetic particle motion includes axial oscillation, and in 40 the preferred manner includes an oscillation of the entire particle. In at least one portion of the transducer a magnetic field, called a stream, is provided to move the particles in one general direction along a single path, while oscillating the particles back and forth. A single particle in the stream moving along the path will move, for example, one unit of length forward and one-half a unit of length backward with every cycle of the current. The particles moving in the stream can be used to clean between teeth 50 that abut one another. The method set forth herein utilized to clean the teeth includes the placement of material in the mouth cavity, thereafter sealing off the mouth cavity by the tongue which will block the entrance to the throat and the nasal cavity, and the lips are closed to seal the mouth cavity from the outside. A varying magnetic field is thereafter produced and brought adjacent the external portion of the mouth cavity. From this external position the magnetic particles within the mouth cavity are agitated to 60 clean all the teeth with mechanically educting the device to the particles. The particles following a single path may be utilized as a tooth pick or piece of waxed string to effectively clean the adjacent surfaces of abutting teeth in the mouth 65 cavity. The various flight patterns for the particles may be arranged that differ from the general oscillating action used for cleaning the front and back surfaces of one's teeth. Many varied magnetic field patterns,

that control 7o the particle movement, may be, provided to provide specific scrubbing action that may be necessary in cleaning specific areas of the teeth. These flight patterns may be varied by well-kno,wn nieans to provide various shaped magnetic fields. The user can actuate a- particular fli-ht 75 pattern by manipulating the magrietic Feld-producing

3,514,328 5 device into various positions or by switching the input on and off to various transducers or windings. It should also be noted that the same basic device disclosed herein may be utilized to clean items other than teeth. If a tub is provid6d to take the place of the mouth cavity, the disclosed method and apparatus may be used as a dishwasher for cleaning all types of utensils including pots and pans. The material is placed in the tub with the magnetic field-producing device cbnnected to the outside of the tube. Also, the same type of method and apparatus may be used as a clothes washer. The many variables set forth herein above may be easily adjusted to provide a combination dishwasher and clothes washer, each of which would roquire various inputs into the tub to agitate the material - therein. The instant invention has been shown and described herein in what is considered to be the most practical embodiment. It is recognized, ho@wever, that departures may be made therefrom within the scope of the invention as disclosed herein. Therefore this invention is not to be limited to the details disclosed herein but to be accorded the full scope of the claims so as to embrace any and all equivalent methods and apparatus. What is claimed is: 1. A method of cleaning teeth in a mouth cavity which comprises the steps of placing a material that is susceptible to varying magnetic field in the mouth cavity, sealing the mouth cavity by use of the lips and tongue, and actuating a teeth cleaning device

outside of the mouth cavity to produce a varying magnetic field to clean the teeth by activating said material in the sealed mouth cavity. 2. A method of cleaning teeth in a mouth cavity as set forth in claim 1, wherein 6 the material includes particles susceptible to a magnetic field, and the varying magnetic field which is produced is capable of penetrating the cheeks to agitate the particles in the mouth cavity to clean the teeth. 3. A process of cleaning teeth in a mouth cavity comprising, placing material including a plurality of very small particles movable under the influence of a magnetic 10 field in the mouth cavity adjacent the teeth, and actuating a teeth cleaning device outside the mouth cavity to produce a varying magnetic field within the mouth cavity to move the particles against the teeth to clean the teeth. 15 4. A process. of cleaning teeth in a mouth cavity as set forth in claim 3 including, manipulating the teeth cleaning device to direct the movement of particles against various portions of the teeth in order to clean the teeth. 20 5. A process of cleaning teeth in a mouth cavity as set forth in claim 3 including, manipulating the teeth cleaning device to control the force of particles against various portions of the teeth in order to clean the teeth. 25 References Cited UNITED STATES PATENTS 2,735,231 2/1956. Simjian. 2,735,23.2 2/1956 Simjian. 3(MORRIS O. WOLK, Primary Examiner B. S. RICHMAN, Assistant Examiner U.S. Cl. X.R. 3;-) 134-7, 8; 32-50; 51-9